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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,188	03/02/2004	Katsunori Suzuki	118655	2943
25944	7590	11/14/2006	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			MACARTHUR, SYLVIA	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/790,188

Applicant(s)

SUZUKI ET AL.

Examiner

Sylvia R. MacArthur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 10-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3 and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Suzuki et al (US2003/0029565).

Re claim 1: Suzuki et al teaches a quartz ring 20 (see [0051]) for use in a plasma processing apparatus, comprising: an inner perimeter, a main surface extending outwardly from the inner perimeter; a first portion around the inner perimeter, the first portion having a flat first region on the main surface; and a second portion adjacent to an outer perimeter of the first portion having a smaller thickness than the first portion, the second portion having a second region adjacent to the first region on the main surface, the second region having a height lower than that of the first region; wherein the first region and the second region are regions of the quartz ring and are parallel to each other, see Fig. 1.

Re claim 2: The second region is flat and is parallel to the first region, see Fig. 1

Re claim 3: Fig. 1 of Suzuki et al illustrates a flat second surface 18 that is parallel to the first region.

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Re claim 6: Suzuki et al further teaches a processing chamber 12, a electrode 16, and a quartz ring 20 comprising: an inner perimeter, a main surface extending outwardly from the inner perimeter; a first portion around the inner perimeter, the first portion having a flat first region on the main surface; and a second portion adjacent to an outer perimeter of the first portion having a smaller thickness than the first portion, the second portion having a second region adjacent to the first region on the main surface, the second region having a height lower than that of the first region; wherein the first region and the second region are regions of the quartz ring and are parallel to each other, see Fig. 1.

Re claim 7: See Fig. 1

Re claim 8: See Fig.1, substrate 26.

Re claim 9: See upper ring 18.

3. Claims 1-3 and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Dhindsa et al (US 6,391,787).

Re claim 1: Dhindsa et al teaches a quartz ring see Fig. 1A/1B, teaches a quartz ring 17 (see col. 6 lines 1-10) for use in a plasma processing apparatus, comprising: an inner perimeter, a main surface extending outwardly from the inner perimeter; a first portion around the inner perimeter, the first portion having a flat first region on the main surface; and a second portion adjacent to an outer perimeter of the first portion having a smaller thickness than the first portion, the second portion having a second region adjacent to the first region on the main surface, the second region having a height lower than that of the first region; wherein the first region and the second region are regions of the quartz ring and are parallel to each other.

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Re claim 2: The second region is flat and is parallel to the first region, see Fig.1A,B

Re claim 3: Fig.1A,B of Dhindsa et al illustrates a flat second surface 11 that is parallel to the first region.

Re claim 6: Dhindsa et al further teaches a processing chamber, a electrode 19, and a quartz ring 17 comprising: an inner perimeter, a main surface extending outwardly from the inner perimeter; a first portion around the inner perimeter, the first portion having a flat first region on the main surface; and a second portion adjacent to an outer perimeter of the first portion having a smaller thickness than the first portion, the second portion having a second region adjacent to the first region on the main surface, the second region having a height lower than that of the first region; wherein the first region and the second region are regions of the quartz ring and are parallel to each other, see Fig. 1A,B.

Re claim 7: See Fig. 1A,B

Re claim 8: See Fig.1, substrate 15.

Re claim 9: Dhindsa et al teaches a second quartz ring 11 see col.5 lines 1-5.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al or Dhindsa et al.

5. The teachings of Suzuki et al or Dhindsa et al were discussed above.

Suzuki et al or Dhindsa et al fail to teach the specific dimensions for the heights of the first and second regions.

Suzuki et al teaches in the abstract that the stepped portion inhibits the deposition of film on the ring and thus decreases the contamination of the processing chamber and increases the operation rate.

Dhindsa teaches in the abstract that the geometric features of the stepped upper and lower ring achieve the desired etch profile across the wafer surface.

The specific height of the stepped regions is a matter of optimization which is held to have been obvious over *In re Boesch* 205 USPQ 215 (CCPA 1980) that it is well within skill of in the art to determine the optimum values of cause effect variables. The motivation for provide a difference in height between the first and second regions with the first region being higher than the second is to protect the chamber and electrodes from damage from the plasma process.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the heights of the first and second regions and their subsequent difference in height to ensure optimal protection of the chamber and electrode.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art of Suzuki et al or Dhindsa et al in view of Ma et al (US 2002/0139478).

The teachings of the prior art of Suzuki et al or Dhindsa et al were discussed above.

Both Suzuki et al and Dhindsa et al fail to teach a beveled portion along the inner perimeter.

The prior art by Ma et al teaches a ring surrounding a workpiece in a plasma chamber.

Fig. 4 of Ma et al illustrates a beveled inner perimeter. In section [0039] Ma et al teaches that the spatial contour or bevel along the inner perimeter is an optimal shape whose motivation is to minimize the difference between process performance near the perimeter of the workpiece and the center of the workpiece.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to bevel the contour along the inner perimeter of the quartz ring of Suzuki et al or Dhindsa et al to provide an optimize flow of plasma toward the substrate away from the electrode which are easily damaged.

#### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection. Applicants amendment to claims 1 and 6 that the first and second regions are region of the ring and are parallel to one another and that the apparatus is held to a quartz ring led to the introduction of Suzuki et al and Dhindsa et al as primary prior art, both of which disclose quartz rings with the claimed structural limitations.

Regarding applicant's argument on page 10, paragraph 3 that the Dhindsa et al does not teach a second ring. The upper electrode 10 with step 11 is an integrated structure of a quartz ring with a stepped portion; note the integrated structure has a main surface and a stepped portion. Claim 9 does not recite that the second ring surrounds the second electrode or is separate from the electrode.

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

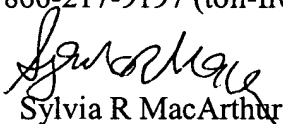
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sylvia R MacArthur  
Patent Examiner  
Art Unit 1763

November 9, 2006